CLAIMS

1. A composition comprising:

(a) a polymeric liquid; and

(b) a viscosity modifier comprising a solid material active in lowering the viscosity of the polymeric liquid, the solid material being at a concentration of less than about 2% by weight of the composition and with particle sizes less than about 75 microns equivalent spherical diameter and an amorphous content of greater than about 93% by weight.

2. A composition comprising:

a) a polymeric liquid selected from the group consisting of a thermoset polymeric liquid and a thermoplastic vulcanizate polymeric liquid; and

(b) a viscosity modifier including a solid material active in lowering the viscosity of the polymeric liquid, the solid material being at a concentration of less than about 2% by weight of the composition and with particle sizes less than about 75 microns equivalent spherical diameter.

3. The composition of claim 2 wherein the solid material lowers the viscosity of the polymeric liquid at stress amplitudes and strain rates where a linear relation exists between stress amplitude and strain rate.

4. The composition of claim 2 wherein the solid material lowers the viscosity of the polymeric liquid at stress amplitudes and strain rates approaching and exceeding the critical stress value of the polymeric liquid.

5. The composition of claim 2, the solid material comprising a preparation of a crystalline carbonate, a crystalline phosphate, a magnesium alumino silicate, a magnesium silicate, a metal oxide or a crystalline silicone dioxide.

6. The composition of claim 2, the solid material having an amorphous content of greater than about 85% by weight.

7. The composition of claim 1 or 6, the solid material having a crystalline content of less than about 1% by weight.

8. The composition of claim 1 or 2, the solid material comprising a preparation of aluminosilicate.

9. The composition of claim 8, the solid material having a cristobalitte content of less than about 1% by weight.

10. The composition of claim 8, the solid material comprising a preparation of milled naturally occurring aluminosilicate.

11. The composition of claim 1 or 2, the solid material having particles of at least about 50% by weight of a Mohs hardness value ranging from about 3 to 6.

12. The composition of claim 1 or 2, the solid material having particles with a non-symmetrical shape.

13. The composition of claim 1 or 2, the solid material having particles with an aspect ratio of at least about 0.6.

14. The composition of claim 1 or 2, the solid material having particles with uneven surface morphology.

15. The composition of claim 1 or 2, the polymeric liquid including at least one recycled polymer.

16. A finished polymer of the composition of claim 1 or 2.

17. An article comprising the composition of claim 1 or 2.

18. A composition comprising:

(a) a polymeric liquid; and

(b) a viscosity modifier comprising a solid material active in lowering the viscosity of the polymeric liquid, the solid material at a concentration of less than about 2% by weight of the composition and with particle sizes less than about 75 microns equivalent spherical diameter, but excluding a viscosity modifier consisting of a preparation of naturally occurring aluminosilicate.

19. The composition of claim 18 wherein the solid material lowers the viscosity of the polymeric liquid at stress amplitudes and strain rates where a linear relation exists between stress amplitude and strain rate.

20. The composition of claim 18 wherein the solid material lowers the viscosity of the polymeric liquid at stress amplitudes and strain rates approaching and exceeding the critical stress value of the polymeric liquid.

21. The composition of claim 18 wherein the polymeric liquid comprises at least one recycled polymer.

22. The composition of claim 18 wherein the solid material comprises a preparation of a crystalline carbonate, a crystalline phosphate, a magnesium alumino silicate, a magnesium silicate, a metal oxide or a crystalline silicone dioxide.

23. The composition of claim 18 wherein at least about 50% by weight of the solid material has a Mohs hardness value ranging from about 3 to 6.

24. The composition of claim 18 wherein particles of the solid material have a non-symmetrical shape.

25. The composition of claim 18 wherein particles of the solid material have an aspect ratio of at least about 0.6.

26. The composition of claim 18 wherein particles of the solid material have uneven surface morphology.

27. A method of lowering the viscosity of a polymeric liquid, the method comprising dispersing and distributing throughout a polymeric liquid a viscosity modifier, the viscosity modifier comprising a solid material active in lowering the viscosity of the polymeric liquid, the solid material at a concentration of less than about 2% by weight of the composition and with particle sizes less than about 75 microns equivalent spherical diameter and an amorphous content of greater than about 93% by weight.

28. A method of lowering the viscosity of a polymeric liquid, the method comprising:

(a) providing a polymeric liquid selected from the group consisting of a thermoset polymeric liquid and a thermoplastic vulcanizate polymeric liquid; and

(b) dispersing and distributing throughout the polymeric liquid a viscosity modifier, the viscosity modifier comprising a solid material active in lowering the viscosity of the polymeric liquid, the solid material at a concentration of less than about 2% by weight of the composition and with particle sizes less

than about 75 microns equivalent spherical diameter.

29. The method of claim 28 wherein the solid material lowers the viscosity of the polymeric liquid at stress amplitudes and strain rates where a linear relation exists between stress amplitude and strain rate.

30. The method of claim 28 wherein the solid material lowers the viscosity of the polymeric liquid at stress amplitudes and strain rates approaching and exceeding the critical stress value of the polymeric liquid.

31. The method of claim 28 wherein the solid material comprises a preparation of aluminosilicate.

32. The method of claim 28 wherein the preparation has a glass content of at least about 85% by weight.

33. A method of altering the performance of an additive in a polymer, the method comprising mixing the additive and a polymeric liquid in the presence of a viscosity modifier to form a composition, the viscosity modifier comprising a solid material active in lowering the viscosity of the polymeric liquid, the solid material at a concentration of less than about 2% by weight of the composition and with particle sizes less than about 75 microns equivalent spherical diameter.

34. The method of claim 33 wherein the solid material lowers the viscosity of the polymeric liquid at stress amplitudes and strain rates where a linear relation exists between stress amplitude and strain rate.

35. The method of claim 33 wherein the solid material lowers the viscosity of the polymeric liquid at stress amplitudes and strain rates approaching and exceeding

the critical stress value of the polymeric liquid.

36. The method of claim 33 wherein the polymeric liquid comprises at least one recycled polymer.

37. The method of claim 33 wherein the solid material comprises a preparation of aluminosilicate.

38. A method of identifying a solid material for use in polymer processing, the method comprising:

(a) providing a composition of a polymeric liquid and a solid material,

(b) measuring the viscosity of the composition as a function of stress amplitude, strain rate and temperature; and

(c) determining whether the viscosity is lower for the composition compared to the polymeric liquid at stress amplitudes and strain rates where a linear relation exists between stress amplitude and strain rate.

39. The method of claim 38 further comprising the steps of measuring and evaluating the effect of a solid material characteristic on the viscosity of the composition, the solid material characteristic selected from the group consisting of particle size, particle shape, weight percent concentration of the solid material, structure of the solid material, and chemical composition of the solid material.

40. The method of claim 38 wherein the solid material has a concentration of less than about 2% by weight of the composition and particle sizes less than about 75 microns equivalent spherical diameter.

41. The method of claim 38 wherein the solid material comprises a preparation of aluminosilicate.

42. A method of influencing polymer processing efficiency, comprising:

(a) preparing a composition comprising a polymeric liquid and a solid material identified by the method of claim 38; and

(b) processing the composition in accordance with the composition's lower viscosity.

43. The method of claim 42 further comprising selectively altering at least one solid material characteristic at stress amplitudes and strain rates where a linear relation exists between stress amplitude and strain rate.

44. A method of influencing the physical and mechanical properties of a polymer, comprising:

(a) preparing a composition comprising a polymeric liquid and a solid material identified by the method of claim 38; and

(b) processing the composition in accordance with the composition's lower viscosity such that the physical and mechanical properties of the polymer are altered.

45. The method of claim 44 wherein the processing occurs at a temperature lower than the processing temperature of the polymeric liquid without solid material.

46. The method of claim 44 further comprising selectively altering at least one solid material characteristic at stress amplitudes and strain rates where a linear relation exists between stress amplitude and strain rate.

47. A method of purging polymer processing equipment, comprising processing a composition comprising a polymeric liquid and a solid material identified by the method of claim 38.

48. The method of claim 47 further comprising selectively altering at least one solid material characteristic at stress amplitudes and strain rates where a linear relation exists between stress amplitude and strain rate.

49. A method of identifying a solid material for use in polymer processing, the method comprising:

(a) providing a composition of a polymeric liquid and a solid material,

(b) measuring the viscosity of the composition as a function of stress amplitude, strain rate and temperature; and

(c) determining whether the viscosity is lower for the composition compared to the polymeric liquid at stress amplitudes and strain rates approaching and exceeding the critical stress value of the polymeric liquid.

50. The method of claim 49 further comprising the steps of measuring and evaluating the effect of a solid material characteristic on the viscosity of the composition, the solid material characteristic selected from the group consisting of particle size, particle shape, weight percent concentration of the solid material, structure of the solid material, and chemical composition of the solid material.

51. The method of claim 49 wherein the solid material has a concentration of less than about 2% by weight of the composition and particle sizes less than about 75 microns equivalent spherical diameter.

52. The method of claim 49 wherein the solid material comprises a preparation of aluminosilicate.

53. A method of influencing polymer processing efficiency, comprising:

(a) preparing a composition comprising a polymeric liquid and a solid material identified by the method of claim 49; and

(b) processing the composition in accordance with the composition's

lower viscosity.

54. The method of claim 53 further comprising selectively altering at least one solid material characteristic at stress amplitudes and strain rates approaching and exceeding the critical stress value of the polymeric liquid.

55. A method of influencing the physical and mechanical properties of a polymer, comprising:

(a) preparing a composition comprising a polymeric liquid and a solid material identified by the method of claim 49; and

(b) processing the composition in accordance with the composition's lower viscosity such that the physical and mechanical properties of the polymer are altered.

56. The method of claim 55 wherein the processing occurs at a temperature lower than the processing temperature of the polymeric liquid without solid material.

57. The method of claim 55 further comprising selectively altering at least one solid material characteristic at stress amplitudes and strain rates approaching and exceeding the critical stress value of the polymeric liquid.

58. A method of purging polymer processing equipment, comprising processing a composition comprising a polymeric liquid and a solid material identified by the method of claim 49.

59. The method of claim 58 further comprising selectively altering at least one solid material characteristic at stress amplitudes and strain rates approaching and exceeding the critical stress value of the polymeric liquid.

60. A method of selecting a polymer-solid material composition for use in industrial scale polymer processing, the method comprising:

(a) selecting a solid material capable of lowering the viscosity of a polymeric liquid of a pre-selected polymer;

(b) determining a polymer-solid material formulation that provides for altered polymeric liquid viscosity;

(c) mixing the solid material and the polymer in accordance with the formulation determined in step (b), providing a polymer-solid material preparation;

(d) screening the polymer-solid material preparation for the absence of adverse polymer-solid material interactions; and

(e) evaluating the viscoelastic properties of the polymer-solid material preparation.

61. The method of claim 60, further comprising, between steps (a) and (b), the steps of coarse milling the solid material, beneficiating the coarse milled solid material, and final milling the beneficiated solid material.

62. The method of claim 60 further comprising the step of drying the beneficiated solid material after final milling.

63. The method of claim 60, further comprising, between steps (a) and (b), the step of classifying particle sizes of the solid.

64. The method of claim 60, further comprising, after step (e), determining the optimal processing conditions for industrial scale processing of the polymer-solid material preparation.

65. The method of claim 60, further comprising, after step (e), selectively altering at least one solid material characteristic in a manner sufficient to achieve at least

one of the objectives of improving processing efficiency of the polymeric liquid, improving performance of additives, improving physical/mechanical properties of a finished polymer, and purging of contaminants from processing equipment.